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DISEASES OF THE NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

PUBLISHED MONTHLY for the PHYSICIAN in the GENERAL PRACTICE of MEDICINE

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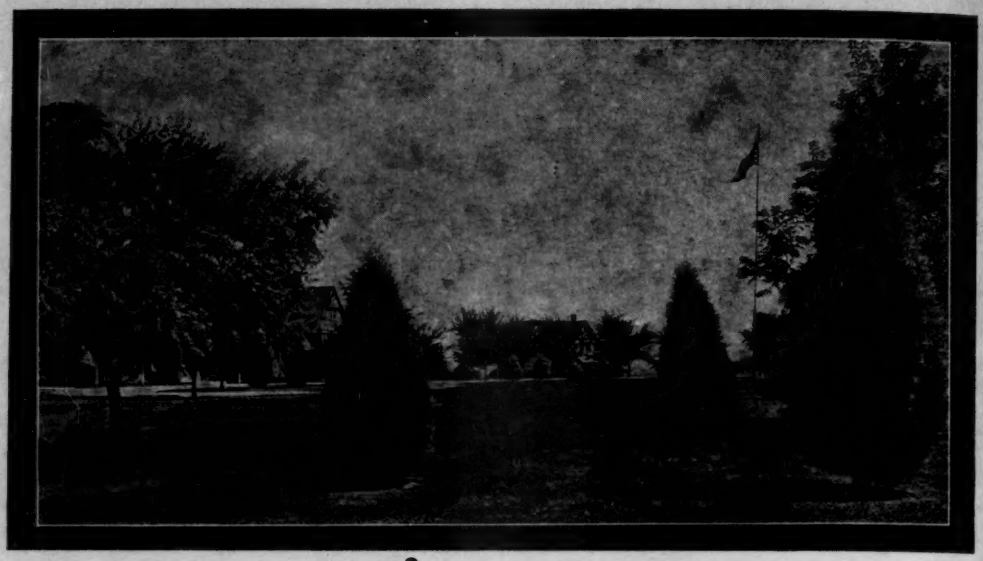

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DISEASES of the NERVOUS SYSTEM

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A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

EDITORIAL COMMENT

A Sketch of my Teacher, Wagner-Jauregg

If you had been strolling along Vienna's Landes-Gerichts-Strasse on a Sunday morning in the Spring some years ago, you might have seen the tall and erect figure of an aged man boarding a street car. He carried in his hand an *alpen-stock;* a wide brimmed felt hat shadowed his face, which was like an ancient wood carving. His dark eyes, hidden below bushy black brows, were gloomily watching the world around him, eyes showing wisdom and goodness. You could, perhaps, hear a father explain to his youngster, "See, that's our famous Wagner-Jauregg." Thus, Wagner-Jauregg, when he was eighty, still kept his old beloved habit of walking for several hours among the hills of the Vienna Woods, enjoying in solitude, the beauty of the landscape. Even in his aged days, he believed in the motto *Mens sana in corpore sano.*

Perhaps this particular belief could be taken as the motto of Wagner-Jauregg's life work, because his most outstanding studies dealt with the fight of mental diseases by means of body treatment. His most popular discovery was the use of artificial fever as a therapeutic method. It was, of course, known even before Wagner-Jauregg's research, that fever acted as a healing agent. However, he was the first to induce fever as a therapeutic measure. As far back as 1887, he investigated the case histories of paretic patients who showed remarkable remissions. He noticed that in these case histories, diseases with high fever were always reported. Therefore, it occurred to him that fever might be of beneficial influence on general paresis and he recommended inducing fever artificially.

However, it took him thirteen years of hard work, until 1890, to find a method suitable for this purpose. At that time he provoked fever by tuberculin injection. In addition, he gave mercury treatments, although the theory of the syphilitic nature of paresis was not yet generally accepted. Later, he used typhoid fever therapy and staphylococcus vaccine. In 1917, he introduced fever therapy by inoculation of the malaria parasite. This treatment proved to be most effective. General paresis, being until this time an incurable disease and one of the worst terrors of man, became to a great extent curable. Wagner-Jauregg was awarded the Nobel prize for having relieved mankind from one of the most dreaded mental diseases.

This was not the only achievement in medicine made by this great man. He studied for many years the relationship between the thyroid gland and psychic conditions. In this field, he collaborated with another Nobel prize winner, Dr. Landsteiner, now living in the United States. This research work resulted in the systematic use of iodine as a preventive and remedy for goiter and cretinism. When one buys iodized salt, he may not know that he is following the advice of Wagner-Jauregg.

These two contributions are the most popular features of Wagner-Jauregg's work. However, in almost every field connected with psychiatry and neurology, he added important and interesting facts. He has written about neuroanatomy and neurophysiology; about anesthesia and its general effects; and about the toxic effects of alcohol. He has also written

(Continued to page 349)

The Psychiatric Evaluation of the Sick Person

WILLIAM C. MENNINGER, M.D.
Topeka, Kansas

Doctor Menninger received his Medical Degree from Cornell University Medical College. He interned at Bellevue Hospital, New York City. Except for some postgraduate work at St. Elizabeth's Hospital in Washington, D. C. and six months' work in Europe he has been continuously associated with his father, Dr. C. F. Menninger, and his brother, Dr. Karl A. Menninger, at the Menninger Clinic, Topeka, Kansas. He serves as Medical Director of the Menninger Sanitarium. He is a Fellow of the American Psychiatric Association and of the American College of Physicians. He is secretary-treasurer of the Central Neuropsychiatric Association, a past-president of the Missouri-Kansas Neuropsychiatric Association, in addition to being a member of the American Psychopathological Association, the American Orthopsychiatric Association, the Chicago Neurological and the Illinois Psychiatric Associations. He has published a monograph on Juvenile Paresis, and has written a considerable number of neuropsychiatric medical papers.

When a physician states that he is going to "examine" a patient, a wide variety of meanings may be deduced. Too often, he refers to his own interest and confines himself to an investigation of a set of organs, or of a functional system. Thus, the neurologist makes a neurological examination, the orthopedist a bone-muscle-joint examination, and so on. Presumably the psychiatrist would make a mental examination. The fact remains, however, that no physician can examine a patient and limit his examination to one set of organs. The psychiatrist must determine the physical and chemical status of his patients with as much care as he does the mental status. And likewise the internist or surgeon needs to evaluate the psychological side of his patients.

The great majority of physicians, regardless of their branch of medicine, do recognize the close relationship between the disease process and the personality. Even though they may be rigid organicists, in their practice they must take cognizance of the patient's temperament and mood. In medical school we were all taught the great importance of making a very careful physical examination. We also had pointed out to us the help that could be expected from physiological and chemical studies. Despite the widespread recognition of the psychologic factor in the causation of disease and the fact that approximately 50 per cent of patients have physical complaints without organic findings —the so-called "neurotic"—most of us did not learn how to make a psychological examination, or how to evaluate the resultant data if we did attempt one. During recent years we have added a host of mechanical devices to aid our diagnostic ability, including the fluoroscope and electrocardiograph and many other kinds of scopes and graphs. Similarly, spectacular advances have been made in evaluating and understanding the psychic portion of the personality, though the average physician is unacquainted with these, and consequently does not use them.

The unfortunate results of this situation are legion. It is all too well known that in the free clinic or the free wards of our general hospitals, the patient with functional complaints is labeled "neurotic" and, if possible, passed by. In private practice such patients do receive some attention, but often the psychological findings are ignored by overemphasis on the physical findings. In the absence of pathology, the treatment is likely to consist of placebos and platitudes. There are many illnesses with organic changes such as gastric ulcer, thyroid disturbances, allergic responses, diabetes, colitis, and many others in which there is nearly always evidence of associated psychopathology, but treatment is usually directed toward the diseased organ, and the psychological factors in such illnesses are ignored.

Using an over-simplified medical analysis of the processes of health and disease, we can discern three elements: the mental or psychological, the physical or anatomic, and the physiological or chemical. When a person becomes sick and goes to a doctor for an examination it is essential that each of these three fields be investigated, and the omission of any one can only lead to erroneous conclusions. The task of evaluating the patient in the psychological sphere is the most difficult examination for the average practitioner to make. Whether the sickness be manifest through the gastro-intestinal tract or the

heart or the emotions, such a complete examination is a necessity. Without such an evaluation, the physician cannot judge the reliability of the history or the validity or nature of the complaints. Consequently, every physician does make some kind of a "mental examination" of every patient whether by intuition or definite plan, and on the results of this examination, in part at least, bases his diagnosis and recommendations.

Granted that it is desirable to make a psychological examination of every patient, there immediately arises a group of questions: how is it done? what is the technique? how does one organize the material and evaluate it? It is the purpose of this paper to answer, in part at least, these questions.

Perhaps, first, it is desirable to reorient the physician in his attitude about this psychological evaluation. Most of us learned about a mental examination in medical school only in connection with psychotic patients and, as a consequence, still regard it as some kind of an interrogative procedure to determine the presence of ideas of persecution or visions of angels. Too often, even by younger psychiatrists, it is regarded as some kind of a ritual or a question and answer game in which the patient's delusions are investigated along with his knowledge of Civil War dates, the color of postage stamps, and his ability to repeat the "Cowboy Story". In its most valuable form, the examination is an emotional experience, an interaction between two personalities. In practice, it is more of an art than a science—it is synonymous with becoming well acquainted with a person, gaining his confidence, extracting his secrets, and obtaining intimate facts about his life. Since it is an art, no rules of thumb or standard procedures can be given that will fit every case, but some suggested methods and attitudes based on psychiatric experience may be helpful.

The Patient's Story

Perhaps the most important point in the technique is for the physician to be a good listener. Sometimes he may need to guide the discourse, but to be sympathetic, patient, and understanding is essential to the successful management of the case. The patient wants to be heard even more than he wants to be seen. Unless he has ample opportunity to tell his story he is likely to be dissatisfied. And the telling of his story should not be regarded merely with indulgence or tolerance on the part of the doctor. It is of importance because first it is necessary for the physician to learn all he can about what his patient thinks and believes, how he feels, and why he thinks what he does. Second, the very act of telling his story to a sympathetic listener constitutes one of our most powerful therapeutic tools in psychiatry—mental catharsis. And third, the very fact that the physician has devoted himself to the patient with sincere interest and so indicated his respect for the patient and for his ideas, means that the physician has laid the cornerstone for building the confidence of that patient in the opinions and recommendations that he may later express.

In giving the patient an opportunity to tell his story (i.e., revealing his mental content) it is necessary to guide the discourse, but rarely to attempt to make a formal psychiatric examination. It is practical to first obtain the information and subsequently to organize the collected data to follow some more formal outline. Every psychiatrist develops his own method of collecting and organizing the data, but the following outline of headings, in the order given, is adaptable in most instances.

I. *The Statement of the Problem:* It is desirable for the physician's orientation that the patient be asked first to give an outline of his problem. Why did he come to the doctor? What are his chief complaints? Some times the answer here may be one word; some times it may be ten minutes of talk; some times it may be so vague or extensive that the patient can't verbalize it.

II. *The Development of the Present Difficulty* follows quite naturally. The patient's main interest is in his own immediate problem and, except to clear up vague points, the fewer times the physician interrupts the patient in relating his story the more effective is his management.

III. *The Past Medical History* follows in importance (from the patient's point of view) the present illness. In covering this subject, it is possible for the physician to ask direct questions and the patient will have no dif-

ficulty in seeing the relevancy to his problem. They are still about his body, his organs and their functioning. The fact that the physician investigates this field with care and interest indicates to the patient the physician's interest in his organic make-up. It establishes the beginning confidence which makes it possible to ask subsequent questions that appear to be less relevant, and gives the physician some physical data that he can use with profit in explaining to the patient possible relationships with his psychological functioning.

IV. *The Developmental History* is easily introduced after the medical history by inquiring into the circumstances of birth, infantile feeding and illnesses, and then into the life events of the individual—the schooling, vocational experience, marital status, progeny, and outside interests. It is often apparent that the patient gains much satisfaction (and relief) from telling his life story. The chances are that no other physician has asked him about it, or led him to believe that it was important. But the physician can be sure that even when the patient waxes enthusiastic and goes into details about some phases, there may be much omitted—the incidents involving guilt, many intimate experiences, reluctantly acknowledged loves and hates, desires and ambitions.

V. *The Family History:* Nearly always in the course of the developmental history, the patient will make some reference to members of his family. At times, it is possible to indicate that there is much one needs to know about the family and that that information will be considered as soon as the patient's own developmental story has been completed.

It is important to know the ages and states of health, or causes of death of the relatives, and such questions can be the starting point in the inquiry. But such data are probably less important for the physician than the patient's reaction and attitude towards the members of his family. Our happiness or unhappiness in family relationships is one of the most important factors in the maintenance of health. Consequently, the patient's own attitudes towards his parents, his brothers and sisters, both in childhood and in later life, are of great significance in evaluating the possible psychological factors in his problem.

VI. *Mental Functioning:* When the physician has completed the above investigations, it is probable that he will have a good conception of his patient's mental functioning. In the great majority of cases he will know whether the patient has mistaken ideas about his illness, whether he has misconceptions or distortions of his environment, or is tormented by the repeated occurrence of disturbing ideas. It is probable that he will have a fair estimate of the patient's intelligence; he will have observed the evidences of mood fluctuation, fears, doubts, anxieties, mannerisms. Particularly is this likely to be the case if he has inquired into such points when the patient has given him an opening in covering the previous material. Such data are important and, occasionally, certain of these points have not arisen or are not apparent. To inquire about such mental attitudes is possible only if confidence has been previously established. And this confidence can be destroyed if the examiner becomes too blunt or too hasty.

VII. *Organization of the Data:* Just as the physical findings and laboratory studies must be organized to contribute to the diagnosis and subsequent treatment, so must the physician organize the psychological findings as he has gathered them through the anamnestic interviews, the mental functioning, the behavior and reactions manifested during the physical and other examinational procedures. The organization of the mental examination makes possible a much more accurate evaluation of the psychological factors in the illness.

It may be helpful to briefly outline one method of organizing this psychological data by classifying it into four major fields of psychic life: perception, intellection, emotion, and behavior.

Under perception we attempt to evaluate the individual's functional capacity to use his five senses and interpret the sensations he receives through them. By means of perception he maintains contact with the outside world and his relative relationship to it.

Perhaps most important under this heading is the extent and degree of the patient's sensitivity, but closely associated with it is the matter of the patient's alertness, his ability to orient himself in a particular situation with

relation to the rest of his environment. An estimate of the perceptual capacity is essential in the evaluation of every patient who complains of pain. Gross disturbances in this field include defects in recent memory, the misinterpretations of things or people in the environment, as well as hearing voices or seeing visions.

Under intellection the physician must always attempt to evaluate the intellectual capacity of the patient. Is it high, average, or low? In addition, he needs to determine what the patient is thinking about and why he thinks as he does, and the presence of such important psychological phenomena as suspicion, fixed ideas or beliefs, mistaken ideas, whether about himself or others. In this field is included the patient's judgment and perhaps most important of all, his insight, i.e., his understanding of himself and his illness. For instance, it is well known to most physicians that nearly every neurotic individual firmly believes in the organicity of his symptoms.

In the field of emotion, the physician should attempt an evaluation of the degree, i.e., the excess or lack of emotional response; the type of fluctuation, i.e., worry, anxiety, depression, euphoria; and inappropriate expressions of emotion. Particularly, should one investigate the patient's loves and hates, learning whom he loves and whether the love is frustrated or disappointed or rivalrous or colored with jealousy. Towards whom is the hate directed, and why? What does he do about it? If the hate cannot be consciously expressed, does he turn it upon himself? Often the physician must evaluate how much the patient loves himself. The great majority of patients have fears of people, of death, or of particular types of disease or calamity and do not mention these unless asked specifically about them. All of these are a part of the patient's emotional response.

In the field of behavior, one must attempt to evaluate how the patient "acts out" in his daily life his psychological strivings and frustrations. This may be shown superficially in impulsiveness, in a high degree of suggestability, in misconduct, in social relations, in appetite or attitude towards food, in sleeping habits. Particularly is it desirable to determine whether the patient causes himself to fail, or whether he inflicts punishments on other people in his environment through unrecognized selfish interests.

If the psychological data, particularly the positive findings in the psychopathology, are so classified, it is often possible for the physician to orient himself not only as to the importance of these factors, but to correlate them with specific physical complaints that the patient may have. For instance, we often find the individual with gastric ulcer to be an over-ambitious, striving, hard-working person who is trying to "take in" to his life an immense amount of territory and this can be directly related to the primitive psychosomatic function of taking in food and striving for love. The patient with constipation often shows the psychological counterpart of stubbornness, willfulness and stinginess, all of them prototypes of the "holding on" process. In functional heart disease there is frequently seen psychological evidence of hate, of disappointment, or of rivalry; all of these parallel the layman's popular conception of the person who for a failure in love is regarded as being "heartsick".

The fact that obtaining this psychological data may be time-consuming is no justification for omitting it, any more than one can omit a gastro-intestinal x-ray series on the basis of time because it requires several hours to perform. Just as exhaustive physical studies may not be necessary in every case, exhaustive psychological studies may not be necessary. Because I have outlined a line of inquiry and a suggested method of organization I do not mean to imply that these must be or even can be followed exactly in every case. Nor should one assume that the technique of obtaining this data—the approach to the patient—is always the same. No one can detail the precise method to be used in an individual case. That part of the technique must be learned from experience and not from books or medical papers. On the basis of psychiatric practice, some general suggestions regarding attitudes and methods of use in so-called "nervous cases" may be of practical help.

The Physician's Attitudes

The attitude of the physician toward the patient varies in every instance, depending

perhaps first on the patient and in a lesser degree on the personality of the physician. In the majority of instances we make some modification of our attitude, depending on the patient's make-up and his problem. Thus, the personality of one physician makes it possible for him to humor his patients—to "kid" them—with good results. For most of us such an attitude would be dangerous. The patient comes to us with doubts, concern, or fear about himself, and for us to take these other than seriously, regardless of their nature, immediately destroys confidence. Likewise, an occasional physician succeeds by making a great show of authority, being hard-boiled, or perhaps being very gruff and a bit loud. He is avoided by a certain class of patients, but, on the other hand, succeeds with some with whom the milder manners of the rest of us are not so effective. Again, most of us couldn't adopt the role of great authority even if we wished to do so. Our own personalities prevent it. Are there any attitudes which can be stated to apply more or less generally to most of us? Yes, perhaps a few.

1. *Helpfulness, rather than prying:* Certainly it is essential in every case to make the patient feel the sincere interest on the part of the physician and his sole wish to be of help. To force the patient to talk about subjects he wishes to avoid, to interrogate regarding personal matters when insufficient rapport has been established, only tends to make the patient feel that the physician is trying to pry into his life and causes resentment. Occasionally, it is helpful to verbally reassure the patient of this interest, to explain the why of certain questions, to point out that the investigation is prompted by a desire to evaluate the whole picture and not merely because of curiosity.

2. *Establish a feeling of confidence and not of awe:* Far too many physicians are inclined, unintentionally, to create an atmosphere of being important, ponderous, and authoritative. That the patient's confidence is based first on respect for the physician is an undoubted fact, but where the patient is made to feel ill at ease in a too-luxurious office, or insignificant in the presence of a Herr Geheimrat Professor Doctor with many degrees and titles, the establishment of a natural, easy relationship is very difficult, if not impossible. The doctor's first words may advisedly be ones of reassurance with the definite purpose of putting the patient at ease and helping overcome any feeling of awe or embarrassment. To have rows of buttons on his desk to call his underlings and a block of telephones, may be practical for the business executive, but not for the physician who wants to win the confidence of the sick person.

3. *Avoidance of a hypercritical, moralistic, or hostile attitude:* When obtaining data from a patient, the physician must assume the role of an uncritical listener. The physician who makes the patient feel that he is critical of the patient's ideas or beliefs or behavior—particularly moral attitudes—will fail to have these revealed to him. If the physician fails to maintain an amoral, objective attitude about sexual matters, he probably won't learn much about this major interest of every individual. If he can't listen to and evaluate the significance of the sexual exploits and practices of his patients with no show of emotion or expression of moral disapproval, he just won't obtain much information from his patients on this score. Such material must be viewed with the same objective scrutiny and scientific attitude that one views a patient's gastro-intestinal "exploits and practices." Also, the physician is frequently annoyed or irritated and as a result he shows a hostile or indifferent attitude to his patient. We should, however, attempt to remain objective regarding ourselves. Irritation and resentment nearly always indicate our own failure, and our method of defense is to be annoyed with the patient.

4. *Do not be condescending:* Unintentionally, the doctor is subtly condescending when he tells a neurotic patient to "forget it," referring to his complaint or worry. Or he may tell the patient with an authoritative wave of the hand that "his ideas are all imaginary." Probably, the physician is sincere, but he may be as confused about the issue as the patient is. Nine out of ten such patients have already been told many times "to forget it," and probably have repeatedly tried to carry out the familiar platitudes of "playing golf," "leading a natural life" or "getting some new interests." They can't do it and such admonitions from the doctor only indicate to the

chronic patient that the doctor doesn't understand the illness—and he is right.

A less subtle condescending attitude is expressed by the physician when he loses patience and shows his irritation in such remarks as, "Don't act that way," "don't look like that," "don't be a child," or "stop the crying." Nurses are prone to adopt such an attitude and the patient may even remark, "You'd think I was a child the way she tells me to wash my teeth." In both these methods of expressing condescension we again must recognize, first, that although the patient's response is infantile, childish, inappropriate, unsocial or selfish, it is still a part of his maladjustment and not to be benefited by scoldings or meaningless platitudes. And second, that such expressions of condescension on the part of the physician are indicative either of his failure to understand the problem or to manage it, or both. His defense, then, is the useless advice or the emotional outlet in the reprimand.

Suggestions Regarding Methods of Examination

The same difficulties in listing definite attitudes to be assumed by the physician in making his approach to the patient, apply to listing any hard and fast recommendations regarding the methods to be used in making a "mental examination" of the patient. Again, on the basis of psychiatric experience some suggestions can be made.

1. *Talk to your patient alone:* The physician places a tremendous handicap on himself if he attempts to interview his patient in the presence of either the relatives or his office assistant. It is often of great help to interview other members of the family, and sometimes it is necessary to obtain a more objective account or to corroborate some data. Not only may one obtain a different point of view from a relative or friend, but this also affords the physician an opportunity to see that much more of the patient's environment. It is a familiar experience to hear the physician remark, "Well, seeing her mother throws some light on why she is what she is."

2. *Observe the patient's mannerisms:* All of us talk not with our words alone, but with our mannerisms, our gestures, our facial expressions, our eyes, and in short, through our total physical make-up. Consequently, the physician's observation of the patient's manner of entering the room, greeting the physician, sitting down, method of talking, and mannerisms can furnish important leads in understanding and evaluating the patient. The patient's reaction to the physical examination may often be more important than the physical findings: his reactions about his teeth, his heart, his genitals, or the prostate examination. With women particularly, the attitudes and reactions regarding disrobing, examination of the breasts and pelvis may be highly significant of facts which the patient reveals in no other way.

3. *Order of questions:* The order of the fields of inquiry as outlined above is important because, first, the subject which seems to be of most importance to the patient should be dealt with first, i.e., the present difficulty. Second, questions relating to family history or mental functioning are likely to seem irrelevant to the patient if asked at the initial interview. Third, by following this order, the patient builds up a rapport which permits intimate details to be discussed quite freely.

4. *Manner of asking questions:* The technique of how to ask questions of the patient is learned only by trial and error. The same question asked by the same physician in the same manner may elicit the desired information in one case and precipitate an emotional outburst in another. When and how to formulate a question must be judged by the examining physician at the moment. In my own experience three common mistakes may be mentioned.

First, the question may be too direct. For instance, "What do you think of your father?" is more likely to incite negativism than the request to "tell me about your father." Likewise, the question, "Do you ever feel like killing yourself and ending it all?" is too blunt, and the subject of self-destruction should be approached through a series of questions regarding satisfactions in life, the results of disappointment, the presence of discouragement. Very often the patient who believes his trouble to be entirely physical reacts to any direct question regarding his mental life by resentment or fear. Thus, the questions "Are you happy? Are you sad?"

are so blunt that the patient concludes that the physician either thinks his mind is affected or resents the implication or becomes fearful that such might be the case.

Second, questions may be too leading, infering that a particular answer is expected. Thus to ask, "You get along well with your husband, don't you?" either makes the woman answer in the positive, or feel that she is out of step with the physician's ideas if she answers negatively. The fear of "reproach" will lead many patients to lie in answer to such questions.

Third, some questions of an intimate nature, particularly regarding the sexual life and desires are asked either too bluntly, or at a time when the rapport is too weak to permit the patient to answer them fully. Rarely in my experience have I found that the patient resents talking about his sexual life, providing that he understands that the physician is investigating it as he does the gastro-intestinal "life". Often it is necessary to do considerable educational work before questioning the patient about this material. Certainly, without preparation of the patient the physician cannot expect any but disastrous results if he bursts out at the sensitive adolescent boy with the query, "How much do you masturbate?" or at the young business or professional woman with, "How often do you have sexual relations?" In both instances 99 out of 100 times the physician would force the patient to lie, as well as to become fearful or resentful.

5. *Don't talk too much:* Physicians as a group are inclined to try to "lecture" their patients, to do excessive explaining, or to attempt interpretations. In short—they talk too much. In part this is understandable because the patient comes to us as if we were superhuman—a magician who can stem the tide of disease. He would like to assume (and often does) that the physician knows all about his trouble. And the physician senses this attitude and does not want to disappoint the patient in refusing to give what is expected. More basically, it is likely that the primitive streak of exhibitionism in us grabs at the opportunity offered by the situation. And so we spout as if we were the all-knowing oracle, all too often using the additional flourishes and embellishments of technical terms to express our weighty "pronouncements" as if they were final judgments. Most of us grew up on such axioms as "Silence is golden," "Still water runs deep," "Studied silence is more effective than glowing rhetoric," but we can't resist the opportunity to express our wisdom. We must not lose sight of the fact that our excessive lecturing, explaining, and interpreting will be of little therapeutic value and often will do harm. Unless we can lead the patient to his own conclusions, our role remains one of the dominating father or the magician.

6. *Be cautious with advice:* Continuing the same theme, the amount of explanation given by the physician depends on the individual, his illness, his suggestability, his intelligence. Certainly specific instructions are in order regarding treatment, but frequently the physician is consulted about marriage, divorce, adoption, childbirth, business decisions and personal relationships. Such consultations may appear to be incidental to a professional call or may be an integral part of the illness. In such instances, it is far wiser to help the patient evaluate his problem and lead him to his own conclusions rather than advise or express a conviction regarding the problem.

In the matter of giving advice it is well to review again the role of the physician. Certainly, it is important that he not lose sight of this role—that of the magician, the individual who is the last stronghold against the inevitable—disease and death. If we are honest, we know that the specific measures in medicine—the drugs, the serums, the antitoxins, the operations—are not applicable in more than 10 per cent of all cases of illness. Even though these specific medications were prescribed and could be dispensed by a slot machine it is doubtful that they would be effective. And so the patient-physician contact is a matter of interrelationships between personalities—an interplay of faith, sometimes intelligent though more often blind, on the part of the patient, and the skillful management by the physician of the power this faith gives him. Thus, the physician holds a unique position—the intercessor between disease and health, death and life, unhappiness and happiness. His pronouncements carry a surcharged value. His advice falls on an over-fertile soil. Hence any opinion or

finding or advice he expresses should be given with a recognition of his position. Certainly, we have learned in psychiatry that it is dangerous to the patient to pass on advice regarding problems concerning his personal relationships. Far more advantageous is it to help him evaluate his motives and desires, and thus lead him to his own decisions.

7. *Avoid technical language:* Every patient easily picks up the medical jargon of his physician, whether it refers to physical or psychological data. When the physician makes this possible he handicaps both himself and his patient. Often it may be the physician's assistants, the nurse or technician, who encourage this through their attempts to answer the patient's questions. It handicaps the physician because the patient hides behind these technical terms, not only fooling himself, but perhaps conveying to the physician the idea that he understands when he does not. Particularly is this true in psychological medicine where the patient either picks up from the physician or from his reading certain concepts which he incompletely understands, and applies them to himself without knowing that he does not understand. The patient makes his own diagnosis of "inferiority complex" or an "unsolved Oedipus conflict." Such a patient is in the same predicament as the apprentice seaman who had forgotten the technical terminology for reporting depth soundings. Rather than admit it to his captain, he took his post at the bow of the ship and with each heave of the lead let out a growl of meaningless syllables. The captain, failing to understand his reports, came up behind him to listen closer. Recognizing the man's failure, the captain dressed him down smartly, demanding to know the why of such a performance. The apprentice replied, "Captain, I know the tune, but I don't know the words." And our patients who "know the tune" should not fool us into believing that they understand the words.

8. *When the patient becomes angry* or when a woman patient develops too strong an attachment for the physician, it is important that he remain objective. While there may be factors in the real situation which have led to such attitudes, in the great majority of situations the physician is a symbolic figure. In the first instance, he becomes the object of hate that belongs to someone else, and often the patient's attention can be called to the point by remarking, "Mr. Jones, you know *I* am sincerely interested in you and am trying to help you. To whom does this hate you express really belong?" Likewise, the physician should not be flattered when an attractive woman patient becomes too attached to him. Again it is not really he, Dr. John Smith, whom the patient loves; he is only a symbol of someone in the past, and again it is occasionally possible to determine who he does represent to the patient. Sometimes it is possible to point out the fact that reality does not justify her attitude and ask who he, the physician, reminds her of. It is assumed, of course, that the physician has refrained from any affectionate gestures in attempting to reassure her. Older physicians can sometimes bestow their paternal smile and caress without danger, but rarely the younger physician.

9. *Evaluation of the patient's story:* Even though the patient has cooperated with good grace and has apparently given all the information asked, the physician can not assume that it is entirely true just because she said it was so. The patient may have said that she did not worry, that she "wasn't the worrying kind," and in fact had nothing to worry about. In a conference a day or a week later you may learn that she lives in constant fear that she will not menstruate. Her husband refuses to take any responsibility for contraception and she lives in dread of becoming pregnant. Such subjective evaluations of our patients are no more likely to be valid than the idea that the patient might express that he has tuberculosis, or does not have tuberculosis, purely on the basis of his own opinion. Very likely his opinion should be given serious consideration, but it should not be taken as final.

The evaluation of the patient's story can be made from various angles. First, in light of the physician's own experience, which for the older practitioner is most reliable. Second, it can be judged by the amount of contradiction which it displays, paradoxical or opposing attitudes to which the patient is blind. Thus, he states that he loves his wife, but in daily life he is thoughtless of her, neg-

lects her, gives her only trivial things, makes her "march to his tune." Third, the patient's story can be judged by the amount of emotion displayed. Excessive emotion, such as a vehement denial or repeated affirmation, usually should be regarded with suspicion by the physician. Also, indifference regarding a particular subject may be an unconscious defense mechanism. The avoidance or passing over lightly of some subjects often is a method the patient uses, either consciously or unconsciously, to protect himself. The patient is on parade and when you are in a parade you may think it better or worse than it really is because *you* are in it. Your opinion at least is biased. But the physician watches the parade go by, and should see its flaws and strong points. It is his function to evaluate every part of it in relation to every other part.

In summary: I have attempted to present an outline of procedures and suggestions regarding methods to be used and attitudes to be assumed by the physician in making a study of his case. I want to stress the point that in every anamnestic interview with a patient, in the physical examination—in short, in every contact, the physician can and should utilize these for making a "mental examination," i.e., an evaluation of the psychological factors or symptoms in the illness. But the suggestions outlined apply to a broader field than any single examination; they are essentially the guiding beacons as observed in a psychiatric practice for winning the patient's confidence, for the management of the delicate relationship between patient and physician. They all point to the single conclusion that the physician should at all times manifest a questioning, searching, scientific attitude towards the total person, characterized further by its sincerity of interest and its purpose of helpfulness.

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The Modern Management of Neurosyphilis*

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The Spinal Fluid Examination

The most important single method of recognizing neurosyphilis is the early spinal fluid examination. It has long been known that if the central nervous system is going to be invaded at all by the spirochete, that invasion occurs very early in the disease. If the nervous system remains uninvolved during the early stages, it very seldom becomes involved later. This means that an early examination of the spinal fluid will enable us to pick out the potential cases of grave clinical neurosyphilis while they are still in the asymptomatic stage.

This examination of the spinal fluid should consist of a cell count, globulin or protein estimation, a Wassermann or Kahn test, and a colloidal gold test. The State Laboratory will ordinarily do the last three, but the physician must do the cell count himself from the fresh spinal fluid. A spinal fluid cell count is very easily done and is a useful tool in many other situations besides the diagnosis of neurosyphilis. These asymptomatic positive spinal fluid patients can then be classified into the following four groups: *(See next page.)*

In cases of early syphilis, spinal fluid examination should be done at the following times:

1. Early in the course of treatment and certainly by the sixth month. If some of the findings are positive (groups 1 to 3), repeated tests should be performed every three months while the patient is under treatment to detect resistance of these spinal fluid changes

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	Cells	*Protein*	*Wassermann*	*Colloidal Gold*
1.	10 or more	Normal or increased	Negative	Negative
2.	10 - 30	Definite increase	Weak positive	Slight change
3.	30 - 100	Definite increase	Positive	Definite change
4.	High	Marked increase	Strong positive	5555543210 (paretic curve)

to chemotherapy, or any tendency to progression toward the dementia paralytica type (group 4).

2. If the first spinal fluid report is entirely negative, subsequent re-examinations should be done under the following conditions:

a. If the blood reverses to negative during treatment, then relapses to positive while treatment is continued;

b. If the patient neglects treatment for a time, then returns for it, he should be checked again completely;

c. If a patient at any time presents symptoms denoting meningeal involvement such as headache, dizziness, nausea and vomiting, stiff neck, diplopia;

d. Before treatment is discontinued and the patient is placed on observation.

In latent syphilis after the secondary stage, and in late syphilis, a spinal fluid examination should always be done early—at the onset of treatment. In the Cooperative Clinical Group Survey of asymptomatic neurosyphilis,[1] it was found that if the disease is four years or more in duration, a completely negative test is evidence that the spinal fluid will, in 99 per cent of patients, never subsequently become positive. Hence, in a case of late syphilis in which the original spinal fluid examination is negative, a relapse in the blood Wassermann does not indicate that the spinal fluid has become involved. In early syphilis, however, a relapse of the blood Wassermann is of more significance and a repeat spinal examination is indicated. However, in either early or late syphilis, if asymptomatic neurosyphilis has ever been demonstrated, relapse in the blood Wassermann warrants retesting of the spinal fluid.

The Role of Fever Therapy in the Treatment of Neurosyphilis

The value of malarial fever therapy in neurosyphilis is well known. Less widely appreciated, perhaps, is the superiority of artificially-induced physical fever over malaria. Some of the reasons for this superiority are as follows:

1. Tabetic pains and gastric crises respond more rapidly and with greater certainty to physically induced fever.[2,3]

2. Patients of advanced age or generally poor condition, or even with coincidental aortitis, may be treated with greater safety by physical fever because the height and duration of the temperature can be accurately controlled.[3,4]

3. Recent work of the Cooperative Clinical Group shows that the results of treatment in neurosyphilis are definitely correlated with the amount of fever given. This prescribed number of treatment hours is more easily obtained with physically induced fever.

4. With physical fever, most neurosyphilitics do not require hospitalization; in those who do, the length of their hospital stay and convalescence is markedly shortened over that required with malaria.

5. Physical fever requires more individual attention from physicians and nurses and is, therefore, more expensive to administer. However, the lack of necessity for hospitalization often counterbalances this to some extent, and in any event this added expense is more than justified by the better results and greater safety.

6. Physically induced fever permits the combination of this non-specific treatment with specific chemotherapy.

A comment on the technique of combined physical fever and chemotherapy as administered in this department may be of value. Using a Kettering hypertherm,* the patient's temperature is raised to 105-106°F. and kept at this level for three hours. Before the treatment an intramuscular injection of bismuth

* We are indebted to Charles F. Kettering, Director of General Motors Research Department, and Dr. Walter M. Simpson, Director of the Kettering Institute for Medical Research, Miami Valley Hospital, Dayton, Ohio, for the loan of the Kettering hypertherms used in our studies.

is given; at the height of the fever an arsenical, usually mapharsen, is injected intravenously. Ten to fifteen of these treatments are given at 4- or 5-day intervals and careful attention is given to the maintenance of the patient's nutrition, salt intake, and vitamin reserve, especially thiamin chloride. Most are treated as out-patients. A few remain in the hospital over night following the treatment, and a very few require continuous hospitalization.

Indications for Fever Therapy in Various Forms of Neurosyphilis

1. *Asymptomatic Neurosyphilis:* If in a case of asymptomatic neurosyphilis the spinal fluid findings on the first examination are of the milder types (groups 1 to 3), repeat tests should be performed every three months while the patient is on continuous alternating arsenical and bismuth therapy. If in spite of intensive chemotherapy the spinal fluid findings do not regress, and particularly if they show progression, fever therapy should be administered. If on the first spinal fluid examination all the findings are strongly positive (group 4), fever should be prescribed at once because of the danger of rapid progression to clinical paresis.

That physical fever will effectively reverse the spinal fluid serology has been shown in many instances. I would like to refer to a group of ten cases described in a previous paper.[3] In 0 to 18 months after completion of fever, 7 of these showed complete reversal; 2 partial reversal; and only one, no change in spinal fluid.

2. *Meningeal and vascular forms:* The preferred treatment in this group, as soon as the diagnosis is made, is physical fever therapy. Particularly in the vascular group with transient aphasia, hemiparesis, recurrent cerebrovascular accidents or convulsions, the results of chemotherapy alone are poor. In this same group, however, the hazards of fever therapy are somewhat greater because of their vascular disease. However, if it be given carefully, they can usually tolerate it; and it is in a group such as this who cannot stand malaria at all that the advantages of controlled physical fever become evident.

3. *Dementia paralytica:* Bismuth, mercury, and arsenicals, (with the possible exception of tryparsamide), when used alone are valueless in the treatment of dementia paralytica. Fever therapy should be given as soon as the diagnosis is made. As to the type of induced fever, malaria is usually quite effective; however, there is recent evidence that physical fever is even more so. Doctors A. E. Bennett and Juul C. Nielsen have kindly permitted me to quote from their unpublished figures based on results at the Hastings State Hospital. From this hospital in the days when all their paralytic dementia cases received malarial fever therapy, 42 per cent were discharged as economic remissions. During the past two years, since they have changed to hypertherm fever and chemotherapy, 63 per cent are being dismissed as having returned to their former economic status. In addition, a few of their malaria failures have been benefited by physical fever.

Moreover, it should be remembered that most cases, even of paralytic dementia, if diagnosed relatively early, can be treated by physical fever on an out-patient basis and the necessity for hospitalization or institutionalization avoided, lessening the economic burden.

4. *Tabes dorsalis:* Results in this disease are much more difficult to evaluate than in other forms of neurosyphilis, partly because it may occasionally show spontaneous remissions, but also because it may show a persistence of symptoms although clinical progression has stopped. Moreover, in tabes dorsalis the results of serologic studies often do not parallel clinical observations. For instance, the most severe symptoms, sometimes leading to drug addiction, often occur in the serologically negative, so-called burned out cases.

Serologic reversal, therefore, although still important, is not quite so important here as in paralytic dementia. Among the most incapacitating symptoms are root pains and gastric crises; in a previous study[3] of symptomatic results in tabes dorsalis these have been shown to be the symptoms most effectively benefited by fever. At the same time it was found that ataxia and bladder involvement were less definitely improved, and Charcot joints not helped at all.

Follow-up Treatment

Follow-up chemotherapeutic agents include arsenicals such as mapharsen and neoarsphenamine, bismuth preparations, tryparsamide, and occasionally potassium iodide. Some comment about tryparsamide may be worth while. It is the only form of chemotherapy that is thought to have any beneficial effect on clinical dementia paralytica if given very early. It is valuable in the treatment of any type of neurosyphilis except the asymptomatic type. It should not be used, however, where the patient presents evidence of disease of the optic tract. If there are no subjective complaints of blurring of vision, no constriction of the visual fields, and no pallor of the disc, tryparsamide may be started in a dose of 0.5 to 1.0 grams. This is increased to a maximum weekly dose of 3 grams. Symptoms of blurring or feathering of vision are signals for stopping the drug. Such subjective symptoms usually precede objective signs by many weeks. Repeated visual field studies are necessary to catch the occasional early case of toxic amblyopia. Symptoms of optic tract damage, if they are going to appear, will usually do so in the first six weeks. As many as 40 to 50 weekly injections of this drug should be given. Since it is a pentavalent arsenical with little spirocheticidal action and probably little effect on serology, it should always be given in combination with intramuscular bismuth.

A patient who has received combined artificial fever and chemotherapy has, as described previously, received in the course of his fever therapy 10 to 15 injections of an arsenical and a bismuth preparation. In a patient with asymptomatic neurosyphilis whose serology is immediately reversed by fever therapy, as many are, only a small amount of follow-up chemotherapy is therefore needed: 10 arsenicals followed immediately by 10 bismuths. Periodic check-up examinations are then necessary, first annually, later less frequently—probably throughout life.

If the serology is not immediately reversed, a longer course of follow-up chemotherapy is naturally necessary. If, as very rarely happens, the serology remains positive even after prolonged chemotherapy, the possibility that a second shorter course of fever will be of benefit should be kept in mind.

In the meningeal and vascular forms, the technique of follow-up chemotherapy does not differ materially from that in the asymptomatic group, with the exception that potassium iodide is empirically considered to be useful, particularly in the vascular forms, and that the bismuth course can be combined with tryparsamide to advantage. In paralytic dementia the length of follow-up treatment should be of longer duration, at least a year. A suggested course of treatment is as follows: Ten injections of mapharsen or neoarsphenamine should be given immediately following fever; then weekly injections of tryparsamide and bismuth for 40 or 50 weeks.

In the follow-up chemotherapy of tabes dorsalis, the same routine used for paralytic dementia may be instituted. In the cases which were sero-negative to begin with, the immediate follow-up course of mapharsen or neoarsphenamine can probably be omitted and tryparsamide and bismuth be proceeded with at once. Potassium iodide has been for years empirically recommended in this and in other forms of clinical neurosyphilis, and is usually given as a saturated solution, minims 10-15 t.i.d. over a long period of time.

It is generally agreed that one of the aims of treatment of neurosyphilis is to reverse the spinal fluid to negative and then maintain this negative reaction. However, in clinical neurosyphilis, in contrast with asymptomatic neurosyphilis, the blood Wassermann is of little or no value as a treatment guide. Wassermann-fastness is common in cases where spinal fluid changes have been completely reversed to negative. It is not justifiable to prolong follow-up treatment indefinitely in the neurosyphilitic patient who is otherwise doing well, merely because his blood Wassermann remains positive.

In addition to the use of fever and chemotherapy directed against the disease itself, attention must also be given to the care of complications of neurosyphilis such as infected cord bladder. In tabetics with intense pain, drug addiction should be avoided. The care of the patient as an individual should not be overlooked. Many of these patients are middle-aged or over, and need attention to nutrition, etc. A few need reassurance against

syphilophobic anxiety about themselves, or about the remote danger of transmitting the disease to others. Finally, when the decision is reached to terminate treatment, the necessity for repeated physical and serologic examinations must be impressed upon the patient, to guard against relapse.

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The Value of Art in a Psychiatric Hospital*

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In 1935 an art class was begun on the Children's Ward of Bellevue Psychiatric Hospital. Since that time, several other art classes have been organized so that, at present, there are art classes on the disturbed, semidisturbed and quiet wards and also on the adolescent boys ward. Papers describing in detail the art work on the children's and adolescent's wards have been given elsewhere.[1,2,3]

Please permit me to express the appreciation of the hospital staff to the Federal Art Project, through which the art work in Bellevue Psychiatric Hospital has been made possible. We wish to emphasize the fact that this art work is not done to make artists, but in order to give our patients free expression of the driving forces within them which have been dammed up, and which, therefore, led to neurotic difficulties. Art work can be appreciated only as a part of the therapeutic work, as a result of which patients are led to free activity. The chief purpose of this work is a therapeutic one, in a deeper sense of the term, and not an occupation for unfilled hours. It is necessary to consider every picture in connection with the mental problems of the patient, and this is true especially in cases of adolescents where the sexual problems appear in a symbolic form. Such pictures not only give deeper insight to the psychiatrist, but also provide insight for the patient himself. To illustrate, an adolescent girl who was sent to us after having incestuous relations with her father drew a picture of a Greek girl standing before a temple and the question of an Electra Complex is to be considered there.

In the drawings of schizophrenics, problems appear in a symbolic form. Patients will sometimes express their desires and strivings by drawing pictures of beasts. The relationship to one's father may be expressed by crystals piercing the lower part of the body. In children, the devil may represent unsolved cruel conflicts. Sometimes, dramatic scenes are depicted, which are the exact replicas of family situations which the children do not dare face.

Many patients are hounded by restlessness and fears, and try to find peace by elaborating tranquil landscapes. Sometimes they will indulge in drawings with very meticulous detail. In neurotic patients the repressed impulses may appear also in a continuous repetition of the same motif.

* From a radio speech delivered over Station W.N.Y.C., New York City, on November 28, 1938.

Patients unable to express themselves verbally may still express their problems in drawings as shown, for example, by the drawings of a girl who was immobolized by her inner conflicts, and who painted a thinly clad, stiff figure carrying the flower of innocence in her hand. This patient was in a catatonic state. A girl of 12, suffering from schizophrenia, was able to regain for a time her relationship to people around her by drawing them in caricature.

One sees that such drawings have diagnostic importance also for the psychiatrist, and may give him valuable hints in understanding the patient's problem. For example, patients who are aggressive will often use lively colors, such as reds and yellows, while darker colors are preferred by those involved in problems of death and annihilation. It makes a great deal of difference if one prefers to draw curves or angles, the latter indicating aggressiveness.

Mentally deficient patients prefer rather primitive forms and are somewhat schematic and empty in their drawings, but, in spite of this, their drawings, in their simplicity, may have some charm. Patients suffering from severe disturbances in brain function, such as general paresis or epileptic confusion are often unable to coordinate the different parts of the human figure and may, for example, paint a mustache in the mid abdominal region, have arms and legs detached or arising from the head or neck. Patients with manic-depressive psychoses often use enormous energy and lively colors in their drawings, often without much understanding of their problem. In pictures of schizophrenics one finds not only the characteristic features of the dissociation or splitting of the aims of the personality, but one also sees the emergence of a great number of primitive form elements, which correspond to those forms used by primitive people and by children.

Many of these problems can be clearly seen in the drawings of normal children, where one can study the development of form principles starting from loops, circles and elipses and going to more and more complicated forms. It is obvious that the emotional problems of children will appear in a particularly clear fashion in their choice of color, form and subject matter. In patients with so-called reading disability, the drawings overcompensate for the defect in the field of reading and such cases show a particularly fine balance with regard to forms and colors.

It is interesting that many of our patients, such as children who have never heard of modern art, have a decided preference for abstractions. This is noted particularly in our schizophrenics.

One may say in general that in the art of the mentally ill or of the problem child very primitive forms make their appearance. There is a great similarity between many of the attempts of modern art and some of the artistic problems with which our patients are confronted. However, although both use material coming from the depths of the unconscious, the artist uses his insight in a methodical way, and thus is more understandable than the mentally ill person who does not find his way back from his deep inner world to the community, unless he is aided by a systematic psychological approach and this we, as psychiatrists, attempt to do.

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Foot Drop from Popliteal Pressure

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The production of foot drop from pressure in the popliteal region is rather common. The causes most frequently described are sitting in the cross-legged position, pressure from casts and pressure of the hyper-extended knees against the bedding during the course of prolonged illness such as typhoid fever. Occasionally, it occurs in carpenters working on flooring in a position of sharp flexion of the knees for long periods, and in persons who stand and habitually lock the knee in the hyper-extended position. In such cases the explanation for the production of the foot drop is usually that the peroneal nerve is injured through pressure against the fibula. This undoubtedly is responsible for some cases, but as was pointed out by Lapinski[1] anemia of a peripheral nerve may result in profound disturbance of its function. It is our opinion that in most cases of foot drop disability is due to pressure upon blood vessels rather than to direct nerve pressure.

If the relationship of the peroneal nerve to the points of pressure is observed in persons sitting in the cross-legged position, it will be noted that rarely is there direct pressure over the peroneal nerve as it winds around the head of the fibula. As a rule, however, if the foot is observed closely in a person in the cross-legged position, slight movement will be noted synchronous with the heart beat. This we interpret as being due to the fact that in the cross-legged position there is pressure on the popliteal artery above its point of bifurcation. If the legs are crossed in thin subjects in whom the dorsalis pedis pulsation is easily palpable or even visible, the pulsation in the crossed leg will usually be found to be less than in the other leg. If the subject leans forward, places the elbow upon the knee and the chin in the palm of the hand, thus adding to the pressure of the crossed leg some of the body weight, complete obliteration of the pulse may occur. Similarly, in subjects sitting with legs over the arm of a chair, reduction of the dorsalis pedis pulse volume is easily noted. These observations point to the fact that the positions as described result in a diminution of blood flow in the blood vessels supplying the lower leg.

Sir Thomas Lewis[2] in his studies of vascular disturbances of limbs noted that after circulation is arrested in an extremity by means of pressure upon the main artery, numbness begins to appear in the tips of the digits in from thirteen to fifteen minutes. The numbness gradually ascends and within half an hour the skin becomes anesthetic. Weakness of the muscles first begins after about twenty minutes, and in thirty to forty minutes a complete flaccid paralysis is produced. These experiments were performed in healthy young adults, and he observed that circulatory arrest of an hour or more permanently jeopardized the function of the extremity. In a limb in which arrest lasted about thirty minutes, recovery of function occurred in one-half to one minute following restoration of circulation.

Lewis also observed that upon release of the obstruction in circulation, tingling and painful engorgement of the periphery quickly occurred, but he pointed out that this paresthetic disturbance also occurred even if blood was prevented from reaching the digits by means of tourniquets, showing that the peripheral disturbance was due mainly to ischaemia of nerve trunks, and that these symptoms of reactive hyperemia may be produced independently of the return of blood to the part involved. It is reasonable to assume that the sensation of numbness and tingling occurring in persons sitting in the cross-legged position is similar to that produced in Lewis' subjects when tourniquets were applied, and that if the position is main-

tained for a sufficiently long period of time it may cause permanent motor impairment.

The following cases with foot drop, occurring as a result of pressure upon the popliteal vessels, present associated evidence of vascular disturbance of severe degree:

Case 1: (Private patient of Dr. S. Mackinnon Ellis) Mrs. A. C., white, was 51 years old at the time of onset on Jan. 13, 1932. For two years prior to onset she had auricular fibrillation and was decompensated on several occasions. The night of onset she attended a theatre and after sitting with her right leg crossed over the left for a short time she began to experience numbness of the right foot. On uncrossing her legs the numbness increased and pain in the foot and leg below the knee became so severe that she had to be assisted from the theatre.

Her physician was called immediately and observed a complete foot drop, but no other obvious disturbance. The pain was so severe that injection of morphine was necessary. The following day, in addition to the foot drop, an oval area of purplish discoloration was noted in the middle third of the anterolateral aspect of the calf. Complete anesthesia to all forms of sensation was present in this area which a few days later underwent gangrenous changes with deep slough that eventually exposed the tibia and fibula.

On May 3, 1932, complete foot drop with little disturbance of power of extension of the foot was noted on the right. The deep gangrenous ulcer was still present and around the margins there was diminution of all forms of sensation. Patellar, Achilles and plantar reflexes were normal. The dorsalis pedis pulsation was absent on the right but present on the left. Osteomyelitis developed, but gradually granulation began to fill in the excavation and eventually, about seven months after onset, healing was practically complete and some power of dorsiflexion had returned. Pain, touch, and temperature sensations were appreciated though markedly diminished in the skin over the area.

Case 2: (Private patient of Doctor Joseph Fitzmaurice) W. H., white, male, aged 38, had many attacks of decompensation for four years due to auricular fibrillation. On April 10, 1932, while severely decompensated, he was propped up in bed with a bolster beneath his knees for comfort. Early in the evening of May 17th he got out of bed and had great difficulty walking because both feet were "asleep." About 10 p. m. he was awakened by severe pain in the right leg below the knee. Morphine was administered and four hours later a similar pain occurred in the other leg. The following day, about 5 p. m., the following neurological findings were noted:

There was complete bilateral foot drop with preservation of extension of foot and all other movements. Patellar and Achilles reflexes were equal and within normal limits and plantar reflexes were normal. On the anterolateral aspect of the right leg there was an area of pale purplish discoloration involving the middle third of the anterolateral aspect of the calf. Skin temperature was markedly reduced in the area. In the other leg in the same area there was no obvious discoloration, but the skin was cold and, as in the right leg, the patient could not recognize touch, pain, hot or cold sensations. Neither dorsalis pedis pulsation could be palpated, and there was some edema over the dorsum of each foot with a slight diminution of touch, pain, and temperature sensations.

Within forty-eight hours after onset, gangrene developed in both the areas described. Five days later, with great aggravation of pain, both legs became completely gangrenous below the knees and the patient died on May 29, 1932.

In both these cases there was obviously occlusion of the anterior tibial artery with resulting gangrene of the anterior tibial group of muscles. The occlusion of the vessels occurred suddenly, and the earliest objective symptom was foot drop. An area of diminished skin temperature was early apparent, with gangrene developing beneath in about forty-eight hours in each instance. A popliteal pressure mechanism was present in both cases, and each patient suffered from severe cardiac disease. Pressure over the peroneal nerve was unlikely.

Case 3: G. W., white, male, aged 39, was admitted to the Neurological Service of the Episcopal Hospital on Oct. 31, 1932, and discharged Dec. 5, 1932. He considered himself well until eight or nine weeks before admission when he lost the ability to walk without

assistance. The night of onset the patient sat upon the toilet to have a bowel movement and read the newspaper. He remained sitting for about a half hour, and upon standing he fell to his knees because of numbness, weakness and some pain in the legs below the knees. He went to bed and the numbness and tingling continued. The following morning the feet and both legs below the knees felt "numb and dead." The feet were slightly swollen and on the inner aspect of the right great toe a bleb filled with bloody serum was noted. The bleb later became dry and at the time of admission was a typical gangrenous ulcer.

Examination upon admission showed the following: There was slight edema of both feet and a definite bilateral foot drop, but not complete loss of power of dorsiflexion. Extension of the foot was normal. The anterolateral aspect of each calf was definitely reduced in temperature in an area, roughly oval, about three inches in diameter and six inches in length. The upper end was opposite the tibial tubercle. There was a loss of touch, pain, heat and cold perception in this area, and over the dorsum of the right foot the same sensations were decreased. Sensation was undisturbed in the left lower extremity. Dorsalis pedis pulsations were never palpable on either side.

Medical examination in this case revealed evidences of myocardial degeneration, and electro-cardiographic examination showed left bundle branch block with definite myocardial depression, a simple bradycardia and sinus arrhythmia. On tonic treatment and heat tent to the extremities he improved slowly, but on discharge he still walked with a steppage gait. In the areas of sensory loss there was still diminished skin temperature, and all forms of sensation, though recognized, were diminished.

In this case there was little possibility of pressure over the peroneal nerve because the rim of the toilet pressed well above the knees, and again symptoms of disturbance in the vascular distribution of the anterior tibial artery were apparent. There was loss of dorsalis pedis pulsation and within ten hours a gangrenous ulcer was forming on the right great toe. This patient also had cardiac disease with peripheral stasis and, as collateral circulation and general circulation were improved, there was improvement of the symptoms of foot drop and associated sensory impairment.

The following cases showed less severe manifestation of vascular disturbance, but gave evidence that the volume of blood flow was diminished in the anterior tibial with resulting alteration of dorsalis pedis pulsation:

Case 4: (Private patient of Doctor T. G. Schnabel) Female, aged 65, examined on Sept. 21, 1937. Six months prior to examination she began to experience trembling of the left lower extremity. She discovered that the tremor could be controlled to some degree by sitting with the left leg crossed over the right knee, and she assumed this position very frequently.

About six weeks before examination, while walking, her attention was directed to the fact that she did not lift her left foot. Because of the foot drop and increased rigidity in the left leg, she had great difficulty in walking. She stumbled considerably and had several falls.

Examination revealed a unilateral Parkinsonism involving both the left upper and the left lower extremities. There was definite rigidity and tremor in the left lower extremity and a foot drop without any associated extensor weakness. The left foot was definitely colder than the right and the dorsalis pedis artery pulsation could not be discovered there, whereas on the right foot it was definitely palpable. On the anterolateral aspect of the calf the skin temperature was definitely diminished and pin prick was felt less acutely in this area, but unfailingly recognized. The patient had lost considerable weight through a rigid dietary restriction, but aside from evidences of mild generalized arteriosclerosis no serious medical disorder was noted.

In this case the rather generalized arteriosclerosis plus the weight loss were probably the important factors which rendered the popliteal vessels more vulnerable to pressure on sitting in the cross-legged position.

Case 5: (From the Neurological Service of The University of Pennsylvania Hospital) E. M., male, aged 51. In November, 1936, he was struck over the right scapula. Pain persisted in the region of the blow and began

to extend upward to the shoulder and down the right arm in the ulnar distribution. He was treated by various measures for brachial neuritis. He was discharged and re-admitted to the hospital on Nov. 1, 1937, at which time he had, in addition to the brachial neuritis, bilateral foot drop. From the onset of pain until his recent admission his weight dropped from 194 to 159 pounds. Almost continually since the onset, in an attempt to gain relief from the pain in his shoulder, he sat in the cross-legged position, leaned forward and threw the weight of his body on the right elbow which was placed upon the knee. While in this position he frequently experienced numbness and tingling of the crossed foot and reversed the position of his legs. He rested in this position almost constantly as it gave some relief. As a result of the severe type of pain a cordotomy was done by Doctor Grant on November 11th.

Examination on November 24th revealed bilateral foot drop complete on the right with little preservation of power on the left. Extensor power was good in both feet, and on the right side there was an absolute loss of pain sensation as a result of the cordotomy. On the left side there was no impairment of pain sensation. The dorsalis pedis pulsation on the left was palpable but not on the right, and there was definite coldness of the anterolateral aspect of each calf.

In all these cases, foot drop occurred as a result of pressure in the popliteal region. Sensory changes, when present, occurred principally in the antero-external aspect of the lower leg, and in the same area there was disturbance of circulation evidenced by the marked lowering of skin temperature. In two, definite gangrene in this area was present. In all cases, the dorsalis pedis artery pulsation was lost or diminished in volume. Peroneal pressure could not account for the absence of the dorsalis pedis pulsation, lowered skin temperature in the described area, or the rapid development of gangrene in two of the cases.

Woltman[3] reported a series of cases of foot drop due to peroneal pressure, mostly from sitting in the cross-legged position, or from pressure of the hyper-extended knees against the bedding in bedfast patients. There was no analysis of the circulatory factors in the lower extremities in these cases, and the state of dorsalis pedis pulsations was not reported. In none was any gangrenous change reported in the anterolateral calf area, but he took cognizance of the possible existence of ischaemic factors.

In the group reported here, I believe a thrombotic lesion of the anterior tibial artery was present in the first two cases and was sufficiently massive to cause gangrene. In case three, the gangrenous ulcer of the great toe was probably due to ischaemia in the terminal portion of the anterior tibial, the dorsalis pedis artery. In these three cases there was severe circulatory impairment due to advanced cardiac damage. In cases four and five no gangrenous lesions developed, but I feel the symptoms were due to ischaemia of the anterior tibial nerve from impairment of circulation in the anterior tibial artery or veins.

The anterior tibial artery is one of the terminal branches of the popliteal. Small nutrient branches to the nerve are given off at almost right angles. It comes off at an angle and passes forward between the tibia and fibula and the two uppermost slips of the tibialis posticus muscle, above the upper border of the interosseus membrane. It then bends sharply downward on the interosseus membrane along with the anterior tibial nerve. This course of the artery renders it especially prone to have the flow of blood within diminished when pressure of the popliteal artery reduces blood flow. During prolonged popliteal pressure, actual thrombotic lesions may form within its lumen, and failure to establish collateral circulation rapidly may cause gangrene as in cases one, two and three. In less severe impairment of circulation the small nutrient branches, being vulnerable because of the angle at which they are given off, may become occluded or the blood flow within may be inadequate to sustain the viability of the nerve trunk and paralysis results. Cases four and five, I feel, are of this sort. Collateral circulation has been sufficiently re-established to prevent gangrene, but the pressure within the main artery is insufficient to maintain the nutrition in the anterior tibial nerve.

In Lewis' experiments, sensory disturbance was first noted at the periphery and reactive

paraesthesias resulted even if blood was not permitted to enter the fingers. This seems to prove that the disturbance depends principally on ischaemia of the nerve trunk and, since the longest fibers in a nerve are more centrally located in the trunk, the effects would be felt first in these centrally located fibers since they are supplied by the most terminal portions of the nutrient arteries.

In order to determine the effect of prolonged popliteal pressure in normal adults, several voluntary subjects sat crosswise in an arm chair with the legs over one arm of the chair, so that there was pressure in the popliteal area, but not over the peroneal nerve. One leg was crossed over the other and in all instances dorsalis pedis pulsations disappeared or were markedly diminished in the leg beneath. The following observations on one subject were quite typical:

Woman, aged 20, after assuming the described position, in three minutes experienced tingling of the right leg, which was underneath. Eight minutes after beginning, the tingling had disappeared and had been replaced by a feeling of numbness without any objective sensory changes. At twelve minutes there was definite subjective and objective coldness in the right foot, and sense of position in the great toe was noted to be definitely impaired. At this time there was also diminution of touch perception, but pain, heat and cold sensations were intact. At twenty-five minutes pain sensation was not perceived over the plantar surface of the great toe or over the anterior third of the plantar surface of the foot. Over the dorsum of the toes pin prick produced an uncomfortable sensation of pain which could not be localized. Thirty-five minutes after commencing the experiment there was almost complete foot drop and definite weakness of the extensors of the foot. Sense of position, passive movement and vibration were entirely absent in the great toe and were severely impaired at the ankle. At forty-five minutes there was complete paralysis of dorsiflexion and almost complete loss of power of extension of the foot. The loss of pain sensation now included all of the toes and anterior one-third of the foot and about one half the plantar surface. In the whole leg below the knee the prick of a pin produced an uncomfortable unlocalizable pain. This was more definite on the anterolateral aspect. Dorsalis pedis pulsation was faintly perceived during the whole time in the right leg and was very full in the left leg.

On removal of the pressure, motor power did not return for one minute, when slight ability to dorsiflex the foot was noted. Following a few attempts at dorsiflexion there was rapid exhaustion, and for about thirty seconds power was again completely lost. In two minutes there was full return of power and sensation.

In this subject care was taken to prevent pressure over the peroneal nerve as it winds around the head of the fibula. The pressure definitely produced a diminution in the dorsalis pedis pulsation, and the resulting paralysis of the extensors of the foot, I feel, was the result of anemia of the anterior tibial nerve. Dorsiflexion was lost in all cases before the power of extension of the foot was disturbed.

In patients observed who developed foot drop following the application of casts for fractures of the femur, tibia or fibula the same alteration of skin temperature was noted in two instances. In these patients I believe that the edema occurring after the application of the cast temporarily retarded circulation in the anterior tibial artery and resulted in foot drop from anemia of the anterior tibial nerve.

One volunteer subject developed a bilateral foot drop as a result of sitting on his heels in a squatting position for thirty minutes. In this subject, the dorsalis pedis pulsations on both sides were entirely lost. Restoration of function occurred promptly upon standing erect.

Lewis states that in persons using crutches over long periods of time thickening of the brachial artery occurs wth occasional gangrene of the digits due to thrombotic lesions. In these patients wrist drop and other evidences of peripheral nerve disturbances may occur.

It is a common experience for those who sleep with their heads or someone else's head upon their arms to experience occasional complete wrist drop lasting for a few minutes. I feel that this type of transient paralysis is also the result of a vascular distur-

bance rather than of pressure upon the nerve itself, and if the vascular interference is continued long enough the paralysis may be permanent.

Pressure upon the nerves produces pain and discomfort. In all these patients and volunteer subjects pain was not a common complaint until after evidence of vascular arrest was present.

Conclusions

There is little doubt that pressure over a nerve will produce paralysis, but I feel that in popliteal pressure, the paralysis and sensory disturbance are more frequently the result of neuro-anemia.

Foot drop from popliteal pressure is common and occurs more often in those with impaired general circulation than in healthy people.

Because of its peculiar anatomical relationship, the blood flow in the anterior tibial artery is prone to be reduced from popliteal pressure, resulting in anemia of the anterior tibial nerve consequently causing foot drop.

The advice given to diabetic patients to avoid crossing their legs should be extended to patients with any evidence of circulatory impairment. This should cut down the incidence of foot drop and vascular disturbances in the extremities.

In persons bedfast for long periods of time it is advisable not only to avoid pressure of clothing on the feet but also in the popliteal region.

Slowing of circulation, I believe, is far more important in the production of foot drop than pressure on the peroneal nerve.

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The Physical and Mental Capacity after Removal of the Right Cerebral Hemisphere

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For a long time the belief has existed that the right cerebral hemisphere in right-handed people can remain clinically silent even in the presence of large, destructive lesions in this portion of the brain. Over a hundred and fifty years ago, Francis Joseph Gall presented a case report of a man in whom the right hemisphere had been totally destroyed by suppuration and yet the intellectual faculties had remained intact up to the time of death. From this observation, Gall concluded that each brain function was doubly represented and, if one hemisphere became diseased, the other would continue with full and normal capacity.

After the studies of Wernicke and Broca in reference to speech function, and after the experiences of brain surgeons during the World War, the concept of lateralization or the theory of hemispheric dominance came into acceptance. It is now generally held that man is a lop-sided creature, that there is a marked physiological distinction between the two cerebral hemispheres and that this one-sidedness is particularly significant in respect to speech and the use of the hands.

With the increasing boldness of the neurosurgeon, a greater opportunity is being offered for study of the effects on the mind and body of man of various, extensive ablations of the brain for tumor. This is particularly so since Dandy[2] initiated the rather formidable operation for removal of the right cerebral hemis-

phere. Penfield[3] has made numerous, detailed notes on the behavior of individuals after various types of brain ablation and Bricker[4] has published an exhaustive study of a single individual who successfully survived a resection of both frontal lobes. Other workers such as Gardner[5], O'Brien[6] and Spurling[7] have furnished much valuable data about this new method of observing brain function.

Occasionally, a brain tumor is so disposed in the right hemisphere that it has invaded portions of all the important lobes, but has not penetrated too deeply into the basal ganglia which lies about the third ventricle. Slowly infiltrating gliomas such as the oligodendrogliomas and some of the astrocytomas may often do this very thing. Rather than make a partial resection, which only invites a recurrence and a deeper invasion toward the mid-line, the doughty neuro-surgeon may attempt a total or sub-total removal of the right hemisphere. This operation does not actually mean a resection of an entire half of the brain, for the plane of the incision is deflected away from the midline to pass through the right lateral ventricle, carefully avoiding the large gray structures which lie near the third ventricle, particularly the optic thalamus. The line of incision is shown in Figure 1.

Obviously such an operative procedure is fraught with great hazards such as hemorrhage and post-operative infection often resulting in fatal meningitis. Post-operative tests of physical and mental capacity in most of the patients, who live long enough to survive the shock and infection secondary to such a formidable procedure, have shown relatively little dementia considering the degree of brain mutilation.

A systematic evaluation of the most outstanding neurologic and psychic changes is

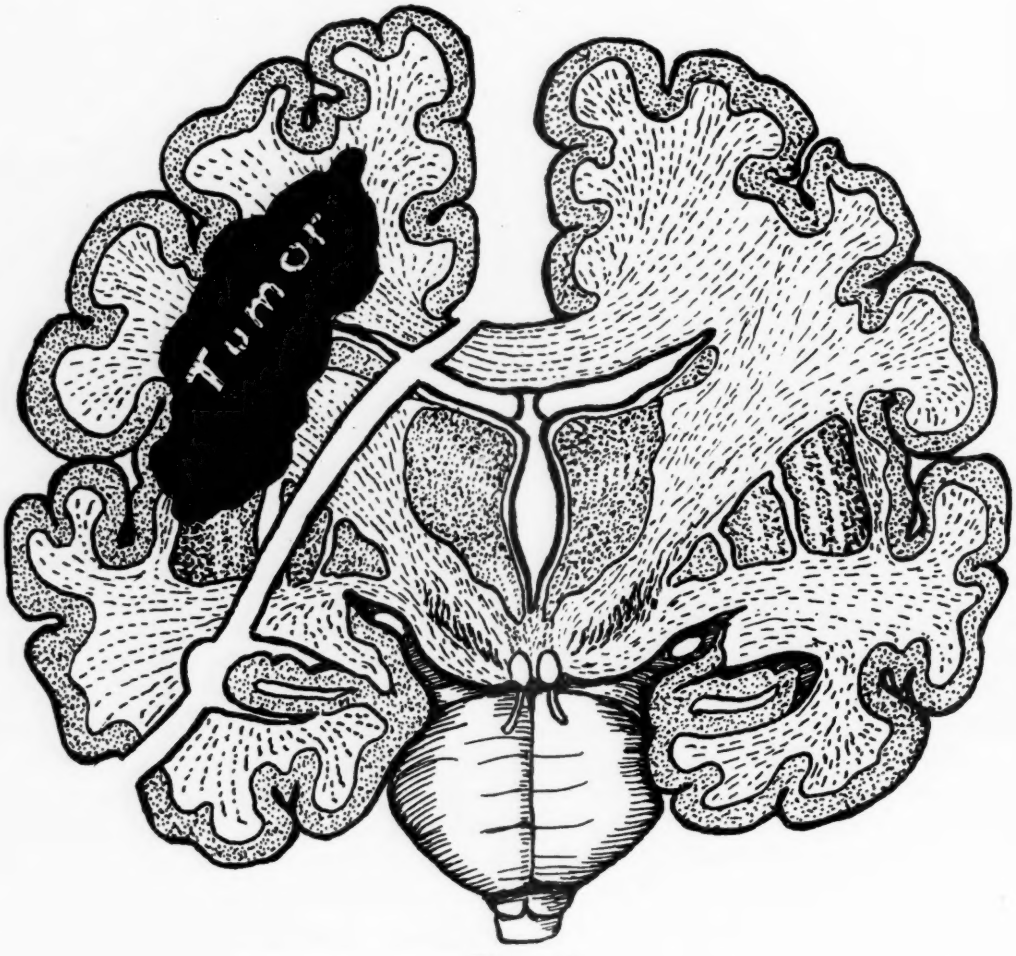

Figure 1

Vertical section through the brain showing the plane of surgical incision in removing the right cerebral hemisphere for tumor.

presented after a study of four patients who have survived a total or subtotal hemispherectomy by at least a period of four months. The neurologic findings have been fairly uniform; it is in the field of mental achievement and in the speech function that the greatest disparities were found. Naturally, all the patients had a left hemiplegia and have been compelled to live rather restricted and sheltered lives, although three of them were able to "carry on" in a limited way. One maintained a chicken farm, the second manages a restaurant and the third, a woman, was able to do the lighter chores incidental to housekeeping for over a year before her death which was caused by a fall down a flight of stairs.

The Physical Status

(a) *The Left Hemiplegia:* This is usually of the spastic type. All four patients recovered physical strength sufficiently to be able to walk in the classic manner of a hemiplegiac. The lower extremity was found to be stiffly extended at the knee while walking and was thrown forward and outward during locomotion. There was much clonic excitement during this performance. Two of the patients could bend the knee on command and all of them could flex the thigh on the abdomen. In none of them could any voluntary movement involving the ankle or the toes be elicited. In the sitting position one of the patients could lift the paralyzed leg off the floor and swing it over across the healthy limb. All four patients had a positive Babinski response and the tendon reflexes on the left side were consistently exaggerated.

The left upper extremity was found in the fixed posture characteristic of spastic hemiplegia, i.e., it was adducted at the shoulder, flexed at the elbow and there was a marked flexion of the fingers and of the thumb in all cases. The wrist, however, was not flexed as it is frequently seen in the elderly hemiplegiac. None of them could shrug the left shoulder but three could, with great exertion, carry the hand upward to the sternum. The fingers could not be moved with voluntary effort, but in all of them there was a feeble grasping action in the flexed digits if some object was placed in the palm.

(b) *The Sensory Defects:* All the patients complained of a peculiar numbness of the left side of the body, as if it were "waterlogged," and two of them complained of paroxysmal, dull aching pain, one in the left chest and one in the region of the left elbow. None of the four were able to appreciate the light touch of a camel's hair brush, either as to the nature of the stimulus, or its exact location over the left half of the body, unless it was dragged over a large area. Only then was there experienced a vague pressure sensation which was roughly localized. All patients failed to discriminate between tepid and cool test-tube stimuli and none of them could recognize the size, shape or consistency of any object placed in the paralyzed hand.

However, whenever the pinprick was applied the reactions in all four patients were fairly typical. The responses were always retarded, indicating a latent period; after this there was a sharp outcry or a crude withdrawal from the stimulus. The pain was invariably appreciated as a diffuse, disagreeable experience which persisted long after the pin was withdrawn. In making successive pinprick stimuli over the affected half of the body, the patients all responded to only every third or fourth shift of the pin. None of them could accurately locate the exact site of the pin-prick, referring it roughly to a general locale such as the knee, elbow, shoulder, etc. A few responses were fairly accurate, but repeated testing revealed the possibility that these were good "guesses." An interesting observation made during the tests with the pin was that the patients as a rule became peculiarly apprehensive after suffering several pain stimuli and the attitude became one of anxious helplessness.

In testing sensation over the left side of the face, there was no appreciation of light touch with the brush, but the pin-prick stimulus was more quickly appreciated and more accurately localized than it was on the left half of the body and the left extremities. Why the trigeminal area should be different in this respect cannot be adequately explained at this time.

In brief, all these patients had lost their finer, discriminative sensations on the left side, i.e., they could not locate or clearly evaluate any type of stimulus. All that was

spared was a crude pain sense which gave rise to a massive, primitive, emotional over-reaction and which offered the patient little information as to the nature and accurate site of the stimulus. This disparity in sensibility is explained by the theory that the sensory cortex, which had been removed, furnishes the finer, discriminative elements in sensation and the thalamus, which had been retained, is the seat of "essential" or primary pain.

(c) *The Left Side of the Face:* In all patients there was a slight weakness in activating the left angle of the mouth. In one patient this was scarcely perceptable. In three patients the lips were evenly retracted on smiling or grimacing; in one the emotional response was slow and incomplete on the left side.

All other facial movements about the nose, the eyes and over the brow were normally performed without asymmetry, either during voluntary or emotional activation.

(d) *The Tongue:* Two patients had deviation of the tongue to the left on protrusion. All of the subjects could move the tongue in every direction. The sense of taste was not noticably impaired in any patient; only one offered the information that the taste was "thinner" on the affected side.

(e) *The Throat:* The palate was normal in appearance and all four patients elevated the arch evenly. The pharyngeal reflex was absent in two patients on the left side.

(f) *The Hearing Function:* Here the findings were definitely confusing. One patient claimed partial deafness in the left ear, two insisted that hearing was equal in both ears and one claimed better hearing in the left ear.

Penfield offers an explanation of some of this inconsistency. He claims that even though hearing is apparently normal in the left ear, the ability to detect the exact location of source of sound (auditory agnosia) is impaired in this ear. This could be confirmed in only one case by the writers. Frequently, the patients were disturbed by recurring spells of tinnitis in one or both ears. None of our patients experienced true auditory hallucinations.

(g) *The Ocular Movements:* No paralysis was found in any of the patients. Voluntary movements in all directions were carried out successfully on command. In two patients the pupils were slightly unequal, the left being a little larger. The light reflexes were consistently normal. In two patients there was a fine, lateral nystagmus.

(h) *The Vision:* A left homonymous hemianopsia was demonstrated in every case. In one patient this was supplemented by so-called visual aurae, which appeared as flashes of red light in the blinded half of the visual field.

(i) *The Sense of Smell:* None of the patients were frankly aware of an anosmia. However, three were found to have impaired olfactory sense on the *right* side. This was easily explained by the fact that the right olfactory bulb and tract were removed along with the frontal lobe, on the inferior side of which these structures are attached. Two patients confessed to an occasional uncinate fit, that is, they experienced paroxysms of peculiar odor, one comparing it to the smell of a "greasy towel" and the other to menthol.

In reviewing the general physical picture of a patient who has had a total or sub-total resection of the right cerebral hemisphere, one can point out these outstanding infirmities: The patient has a left, spastic hemiplegia, but he may be able to limp about with a cane as does any hemiplegiac. He has a spastic leg in extensor rigidity and a spastic arm with a claw or scoop hand, which is rather useless. The left angle of the mouth may be slightly paralyzed. He cannot see objects over his left shoulder, is not ordinarily conscious of deafness and is not at all aware of any loss of his sense of smell. As to his sensory defects, he may occasionally complain of a "heaviness" of the left side, of peculiar crawling sensations and may have paroxysms of diffuse pain about the trunk or joints on the same side. If not irritated by painful stimuli he is not particularly uncomfortable.

The Speech and Mental Status

It is in the function of speech and general mental behavior that these patients may show unpredictable variations. It is ordinarily assumed that the left hemisphere controls speech in the right-handed individual. However, experience with some of the patients who have had a right hemispherectomy lead

one to believe that there are great variations in the degree of dominance of one hemisphere over the other in this respect. The speech function in some individuals may be divided in varying proportions between the two. Moreover, speech does not necessarily follow along with handedness. There is evidence that the one hemisphere may dictate handedness and the other control practically all of the motor speech function. Zollinger[8] of the Mayo Clinic reported the removal of the so-called dominant left hemisphere in a right-handed woman, who survived a day or two and could utter a few intelligible words.

This situation was somewhat like that found in our fourth patient. This man was distinctly left-handed since early childhood. He ate, handled a duck gun and wrote with the left hand. He never attempted to write with the right hand until after the operation, when he could only produce an unintelligible scribbling. He had a glioma of the right parietal lobe, which had not as yet produced a left hemiplegia. It was concluded that since he was left-handed his speech function likewise was located in the right cerebrum. A novocain "block" test of the right Broca area was made so that the left angle of the mouth was paralyzed and, fortunately, motor speech remained unimpaired. After removal of the right hemisphere which included all of the tumor, he continued to speak normally although the left hand is paralyzed and he is unable to write at all. Here it is apparent that the speech function is situated in the intact hemisphere while handedness is dictated by the right side.

The other three patients retained most of the normal attributes of speech. Two had a staccato quality and one had a very slight dysarthria which may be due to the slight weakness of the left side of the mouth.

On attempting to evaluate the mental defects, if any, in a patient with hemispherectomy, the great number of dissenting opinions forbid any concise conclusions. Simple intelligence tests are not likely to show much deterioration, but it must be pointed out again that these patients live sheltered lives and no great demands are made upon them to test some of the higher intellectual capacities.

Three of our patients were studied at irregular periods and no great deviations from normal behavior have been detected. In fact, the wife of the patient described above, insists that all capacities in every respect remain unmarred. Even a mild euphoria or elated state, which was noted by the psychiatrists, was regarded by her as a normal jocosity which was a life-long characteristic of her husband. His judgement, ability to handle accounts and to plan menus for his restaurant and his insight into his condition were normal. The husband of our woman patient averred that, not only was she normal in performance, but her disposition actually improved after the operation.

Other observers are equally emphatic in claiming that marked personality changes may ensue after this operation. They describe some of the subjects as becoming facetious, irresponsible, petulant and given to mental torpor and to violent swings of mood. There is noted a depreciation in those faculties which have to do with prolonged deliberation, with close attention and concentration and with control of the primitive instincts. There is a tendency in some to panic and peevishness when assigned a slightly complex duty.

It is probable that such mental aberrations occur because in these subjects it so happens that in removal of the right cerebrum, the dominant frontal lobe has been included in the ablation. Apparently, as in the speech function, the right frontal lobe may be more dominant than the left and may, therefore, carry the higher intellectual capacities. No pre-operative testing or clinical technique is available at this time which can determine just which frontal lobe holds this invaluable ingredient of personality in a given individual.

The practical question naturally arises as to whether a removal of the right cerebral hemisphere is humanely justified in the face of all the physical hazards and the probability that a mental deterioration or an aphasia may ensue. When one contemplates the average destiny of the victim of an infiltrating brain tumor whose life expectancy is very short and who may deteriorate into a drooling dementia and a stupor before many months, it appears that frequently the risk is worth taking.

If the resection of the tumor is complete, if no serious infection or post-operative hemorrhage occurs, and, if the happy circum-

stance of a non-dominant frontal lobe exists, the end result is an individual who may survive for many years. It is true that his limitations are those of a hemiplegiac, but these limitations are not vastly different from those of countless old people who are victims of a vascular accident. Moreover, most of them are younger and more active individuals, who are less irritable and more able to compensate for their physical handicaps.

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Book Review

BIOCHEMISTRY OF DISEASE:

By Meyer Bodansky, Ph.D., M.D., Director of the John Sealy Memorial Research Laboratory, and Professor of Pathological Chemistry, University of Texas School of Medicine, Galveston, Texas, and Oscar Bodansky, Ph.D., M.D., Lecturer in Biochemistry, Graduate Division, Brooklyn College, formerly Biochemist, Children's Medical Division, Bellevue Hospital, and Instructor, Department of Pediatrics, New York University College of Medicine, New York City, 684 pages, 72 figures, 65 tables. Price $8.00. New York, 1940, The Macmillan Company

The authors of this first edition, Drs. Meyer and Oscar Bodansky, combine a rich fund of knowledge in the field of biochemistry with their training in clinical and laboratory medicine. The result is a volume of 684 pages which describes the chemical changes that occur in diseased body organs or systems and comes at a time when further advances in the field of physiological pathology are retarded by lack of general information concerning chemical processes that initiate or follow physical changes. The book is arranged so that organ systems, or related entities, are discussed under separate divisions. There are eighteen chapters, each containing an extensive bibliography with references to the subject material to which the authors refer. An index to subjects and to authors at the end of the manuscript facilitates prompt reference.

Perusal of the contents makes one feel that the book was intended especially as a reference work for the busy clinician and for the medical student, after he had gained some clinical experience. The specialist, for instance, whose interest is centralized in one aspect, yet who has some interest in general medicine, will gain a very broad knowledge of the biochemical changes in all diseases and can secure more details on his particular subject by reading the articles referred to at the end of each chapter.

Thus the last section in the book, "Biochemical Aspects of Neurologic and Psychiatric Disorders," is of special interest to the reviewer. The advent of pharmacologic shock therapy in functional mental reactions has reawakened interest in the biochemistry of mental disorders, and though a voluminous literature has accumulated on this subject, there is a scarcity of books which contain collective information. The Doctors Bodansky have sifted this literature and condensed this information about the biochemistry of mental and nervous disorders. Those conditions which produce a variation from normal usually show chemical alterations in the metabolism or nutrition of the cell body, and the authors remind us that studies on oxidation reduction systems have given more specific information than other means of investigation. This is especially pertinent in the very interesting field of vitamin deficiencies in their relation to the nervous system. Moreover, the role of the vitamins is discussed in greater detail in Chapter XVI under the title, "Miscellaneous Disorders of Nutrition." Certain specific chemical-pathological changes are shown to occur in the functional mental disorders, but the organic diseases of the nervous system are

discussed primarily from a clinical pathological basis, as the known biochemical alterations in this group parallel the statement of the authors about mental deficiency, "... biochemical information in this group of conditions is very scanty, and it is very difficult to relate those few biochemical mechanisms which have been uncovered to the mental deficiency." This portion of the book is illustrative of the thoroughness shown by the authors, and the other sections of the volume, likewise, are equally complete.

Since the other portions of the body have been studied from the biochemical angle for much longer periods of time, sections devoted to the functions of the general body structure will serve to reawaken the clinician to the need for a practical application of those biochemical facts which had formerly been considered a necessary but useless phase in didactic, biological chemistry.

Certain chapters, such as disorders of the kidneys and urinary tract, of the digestive system, muscles, etc., when first studied, appear to contain some clinical and laboratory data, which, if omitted, would produce more brevity, and yet inclusion of such material in the sections on diseases of the liver, bone, heart, and the endocrine system appear to have a more direct bearing on the biochemical aspects of the diseases under discussion. Close examination reveals the purpose for which the authors include this seemingly repetitious material, as the values for most substances, for example, uric acid, cannot be discussed arbitrarily because this substance has a varying significance in many conditions, such as gout, congestive failure, or renal obstruction. Thus we see the necessity of presenting the whole picture in each disease process, and the authors preface the book by this explanation: "... that a systematic presentation of the biochemical aspects of the various diseases, arranged according to clinical entities, would be of distinct value and use to the physician. Since it is through his relation to particular clinical situations that the physician usually experiences his interest in biochemistry, we felt that the arrangement of the biochemical material in accordance with clinical entities would make it pertinent, available and utilizable."

Consequently, the inquisitive student of medicine, with an interest in the pathogenesis of disease, will find here an adequate coverage of the important links in the chain between etiological factors and pathological changes. A greater understanding of illness will be the result, and newer curative procedures may be devised. Finally, it may be noted that this book was selected for the Medical Monograph Series, of which Dr. George R. Minot is Advisory Editor.

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A SKETCH OF MY TEACHER, WAGNER-JAUREGG—*(Continued from page 323).*

many important papers in the field of forensic medicine, in which he was especially interested.

Whoever was fortunate enough to collaborate with Wagner-Jauregg had to admire his clear and profound thinking. As a young man, he anticipated the development of an approaching century and, pursuing his ideas, became a leader of a new generation of physicians.

When his eightieth birthday was celebrated, he spoke over the official radio station in Vienna on the topic, "What I had to learn after my graduation." This was an unusually comprehensive summary of the progress in medicine during the last sixty-five years and it showed how his great spirit had kept pace with the march of his time. Even in his aged years, he did not gloat over the glorious deeds of his past, but strove toward new ideas and achievements.

Wagner-Jauregg was not only a great scientist, but also a famous physician and a brilliant teacher. His lectures at the Vienna University were highly educational and were also extremely interesting and valuable for the trained psychiatrists and neurologists. Among those listening to his lectures one could have found many elderly physicians, most of them practicing psychiatrists and neurologists, who wanted to broaden their knowledge through Wagner-Jauregg's clear and thorough explanations.

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His realistic grasp of circumstances and his practical, sound general viewpoint might be illustrated by the following incident:

His successor, Professor Poetzl, was deeply devoted to his former chief. When we considered replacing malaria fever with fever induced by physical means, Professor Poetzl was opposed to the idea. He did not want to hurt the feelings of the "old gentleman" by replacing Wagner-Jauregg's classic method.

Shortly after, Wagner - Jauregg himself mentioned the subject, saying, "I feel that you have been waiting for some time to induce fever by physical means rather than by using my old method. It would be interesting to start and to improve this method in our hospital. I could provide you with all the papers published on the matter, as I have just completed the translation of the American papers concerned."

Later, when physical methods of fever therapy were discussed, Wagner-Jauregg still maintained his viewpoint that a specific agent produced the beneficial effect in malarial therapy. He based his theory on the fact that success had been obtained in cases where no fever attack had occurred after the inoculation with malaria parasites. However, he was first to express the opinion that the rise in temperature obtained by physical means stimulates the body to a reaction similar to that produced by fever caused by chemical means or by inoculation. He finally concluded that theoretic conceptions are useful as a basis for practical work and that it was immaterial if eventually they have to be discarded. He commented thus: "I am not so much concerned with the theories themselves, but as to whether or not they produce results."

MARTHA BRUNNER, M.D.,
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Newsnotes

MICHIGAN SOCIETY OF NEUROLOGY AND PSYCHIATRY

The first meeting of the year 1940 - 1941, of the Michigan Society of Neurology and Psychiatry was held at Ypsilanti, on Thursday, September 19th. The Scientific Program presented at that meeting was:

a. *Occupational Therapy in a State Hospital,*
H. C. DUNSTONE, M.D.

b. *A Study of Alcohol and Its Relationship to Carbohydrate Metabolism,*
F. W. PALMER, M.D.

The remainder of the Program for the year 1940 - 1941, is as follows:

November 14th—

a. *Brain Abscess, Symptoms and Treatment,*
FREDERICK SCHREIBER, M.D.

b. *The Psychoanalytic Therapy,*
RICHARD STERBA, M.D.

January 16th—

a. *A Tuberculosis Case Finding Program in the Mental Hospital,*
MARTIN H. HOFFMANN, M.D., and
LOUIS J. BAILEY, M.D.

b. *Clinic on Pharmacologic Shock Therapy,*

1. Insulin—
E. N. HINKO, M.D., and
R. LEISER, M.D.

2. Metrazol—Curare—
R. W. CAVELL, M.D., and
M. C. BECKWITT, M.D.

3. Sinusoidal and Faradic Shock—
J. L. KUBANEK, M.D., and
S. H. RUSKIN, M.D.

March 6th—

a. *Discussion of Medicolegal Aspects of Psychiatry,*
Judges of the RECORDER'S COURT.

b. *Demonstration of New Tests Including the Bellevue Test for Adults,*
HELEN L. FLINN, and
PAUL R. OBERLIN.

c. *Demonstration of Apparatus Including Polygraph,*
JOHN A. LARSON, M.D., and
MALCOM V. McCORMICK.

d. *Explanation of the Adjustment Prediction Procedures,*
STUART LOTTIER.

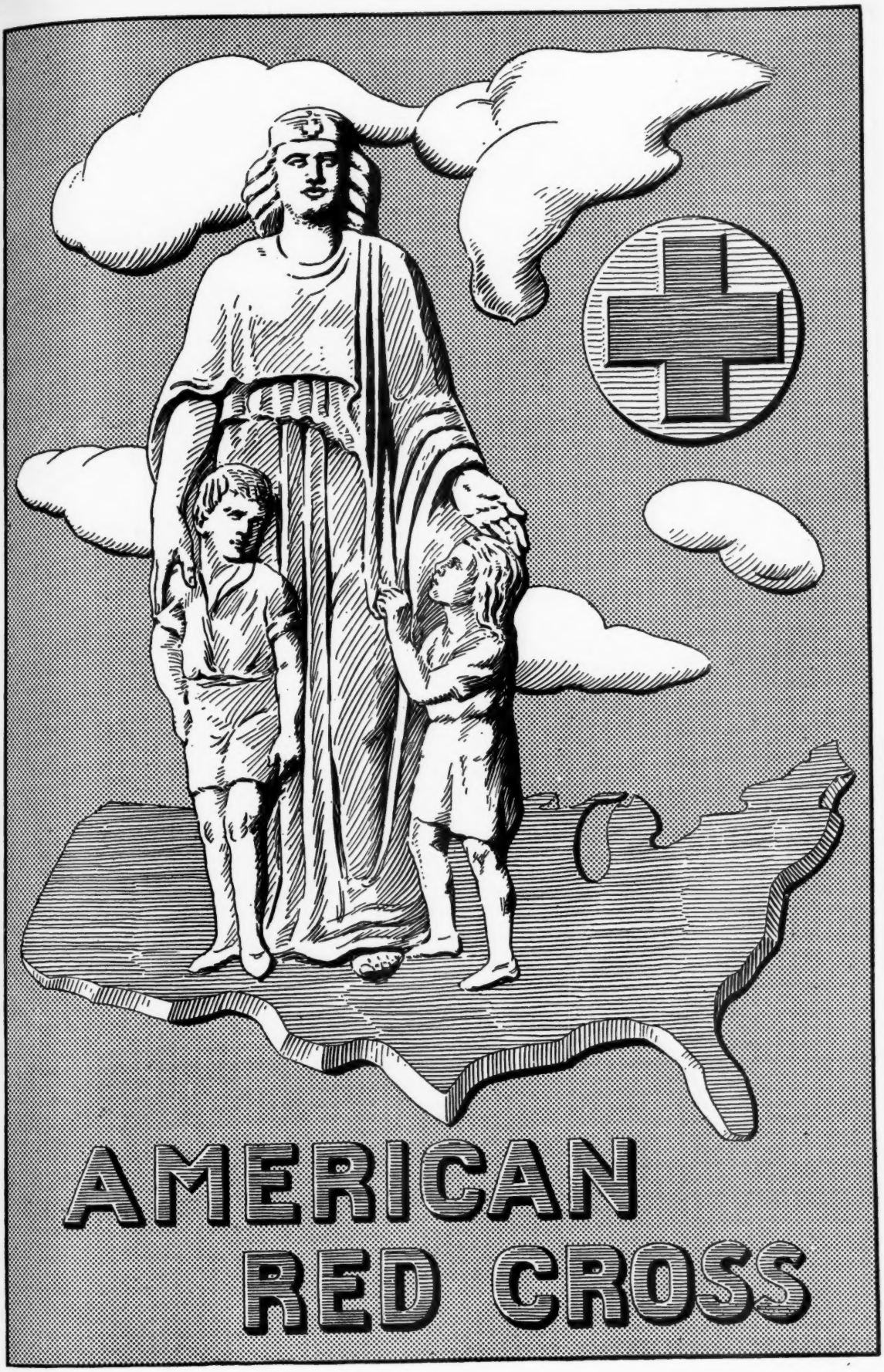
e. *Presentation and Explanation of the Rorschach Test,*
MERVIN PATTERSON.

April 17th—

This meeting to be held at the Neuropsychiatric Institute, University Hospital, Ann Arbor, Michigan.

(Speakers and titles to be announced.)

(Continued to page 352)


AMERICAN
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SANITARIA DIRECTORY

The sanitaria listed in this section are among the finest private sanitaria in the United States.

They are prepared to offer private, individual, specialized care to your patients.

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COLORADO SPRINGS PSYCHOPATHIC HOSPITAL Colorado Springs, Colorado	**PARKWOOD SANITARIUM** Chicago, Illinois
COMPTON SANITARIUM and LAS CAMPANAS HOSPITAL Compton, California	**PASADENA SANITARIUM** South Pasadena, California
DR. GREENWOOD'S SANITARIUM Houston, Texas	**ROBINSON CLINIC** Kansas City, Missouri
GLENSIDE Boston, Massachusetts	**ST. JOSEPH SANITARIUM** Dubuque, Iowa
KENILWORTH SANITARIUM Kenilworth, Illinois	**TWIN PINES** Belmont, California

WOODCROFT HOSPITAL
Pueblo, Colorado

LOS ANGELES SOCIETY OF NEUROLOGY AND PSYCHIATRY MEETING

On September 18, 1940, The Los Angeles Society of Neurology and Psychiatry met at the Los Angeles County Medical Building. The following papers were presented:

Robert E. Wyers, M.D.: *Study of 260 Cases of Mongolism with Special Reference to Congenital Heart Lesions.*

David L. Reeves, M.D.: *Amyotonia Congenita of Oppenheim. Report of case with autopsy.*